P-6.6 Apply formulas in order to solve for resonant wavelengths in problems involving open and closed tubes.

Revised Taxonomy Level 3.2 C_A Apply (implement) procedural knowledge

In physical science students

- Understand that sound waves reflect in tubes or some musical instruments to produce standing waves which reinforce sound through constructive interference.

It is essential for students to

- Understand the concept of forced vibrations
- Understand the concept of resonance
- Understand that a resonant air column can be produced in open or closed tubes.
- Understand the conditions that are necessary for a column of air to be resonant in a specific tube
- Understand and apply the equations for finding the wavelength of a wave that is resonant in a specific tube
  - Closed tube $\lambda = 4(l + 0.4d)$
  - Open tube $\lambda = 2(l + 0.8d)$

Assessment

As the verb for this indicator is implement (apply), the major focus of assessment will be for students to show that they can "apply a procedure to an unfamiliar task". The knowledge dimension of the indicator is "knowledge of subject-specific techniques and methods" In this case the procedure is the application of the formula for wavelength of a resonant wave within a tube.. The unfamiliar task should be a novel word problem or laboratory investigation. A key part of the assessment will be for students to show that they can apply the knowledge to a new situation, not just repeat problems which are familiar. This requires that students have a conceptual understanding of the process of resonance as well as mastery of the skills required to implement the mathematical equation or in order to solve the problem.